

# PAST

THE NEWSLETTER OF THE PREHISTORIC SOCIETY



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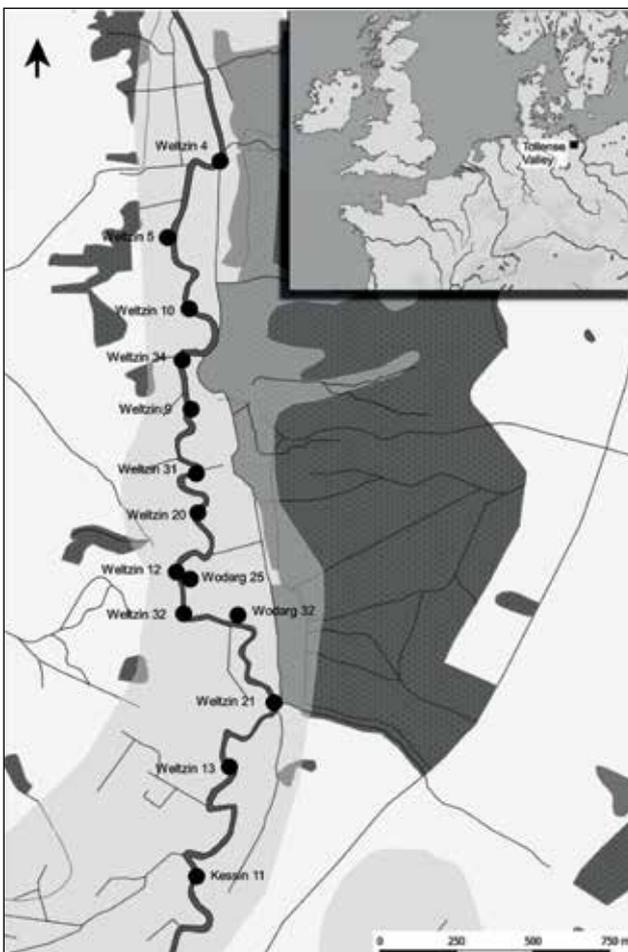
<http://www.prehistoricsociety.org/>

## Micro-traces of a major Bronze Age conflict: digital trauma analysis in the Tollense valley, Germany

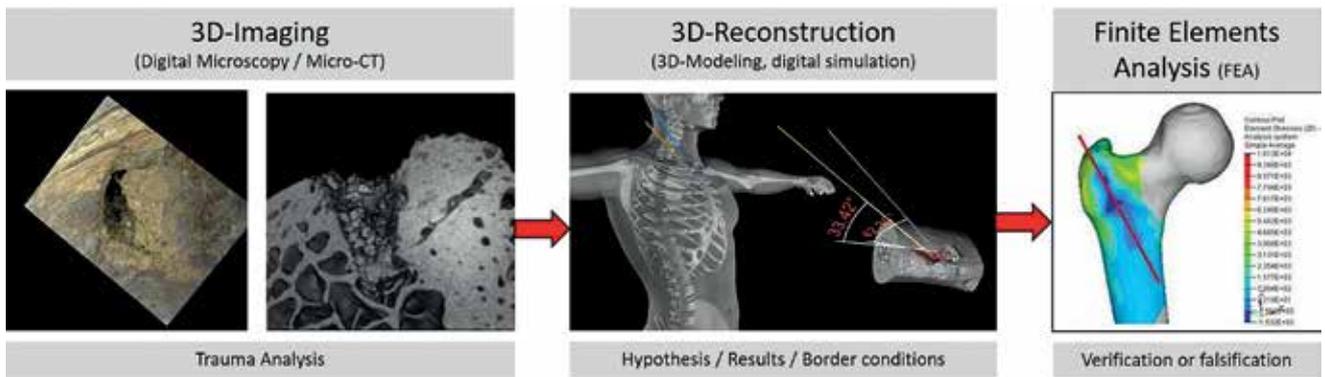
Human skeletal remains can shed light on the life, state of health and death of prehistoric individuals and even on the socio-cultural structures of past communities. In the Bronze Age, a violent mass conflict in the Tollense valley in Mecklenburg-Western Pomerania, north-east Germany, claimed the lives of many mainly young men.

Our palaeomechanical studies focus on the efficiency of the weapons that killed them, the bone trauma they suffered and the way they were fighting. In the following, we outline a methodological process of non-invasive, digital trauma analysis and simulations of the injury mechanisms. We developed this approach to provide additional data supplementing the ongoing archaeological and anthropological investigations of this unique site, but it can be applied to the study of interpersonal conflicts more generally.

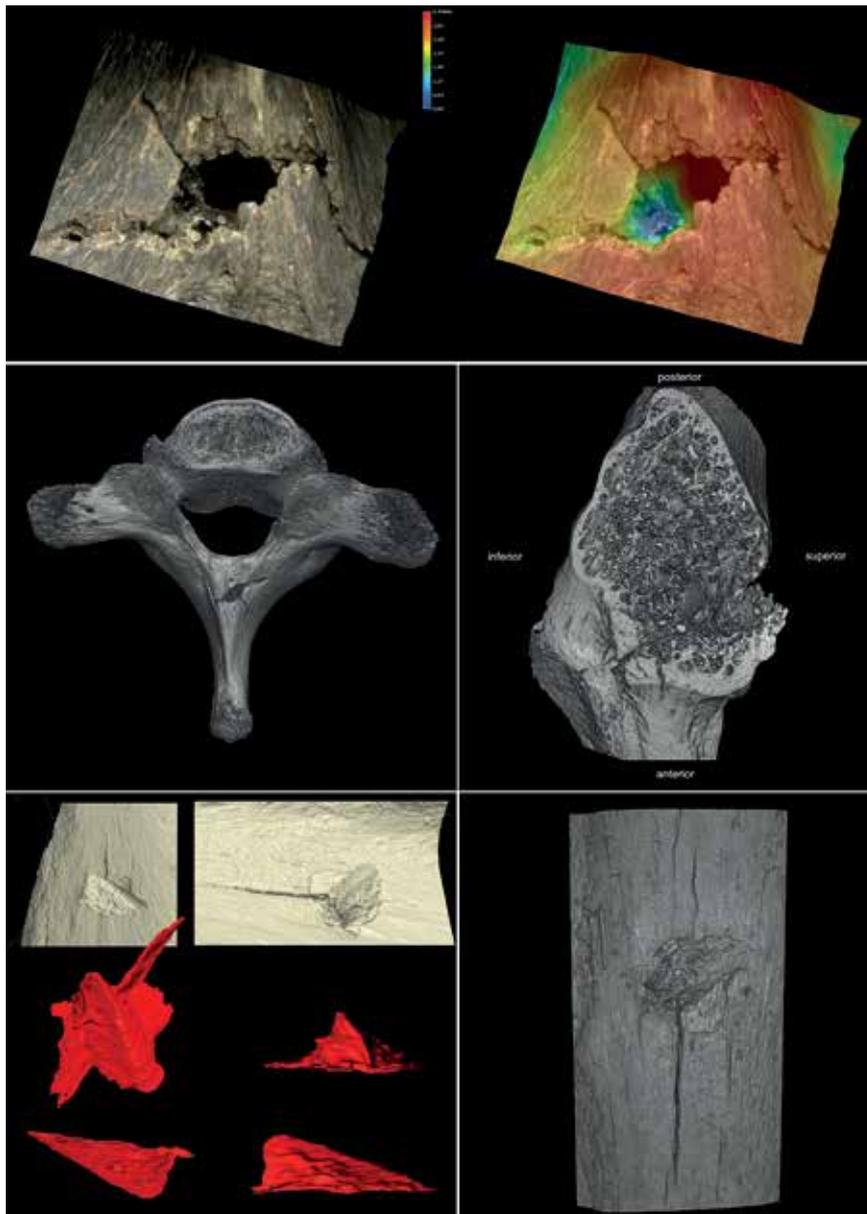
In 1996, amateur archaeologists Ronald and Hans-Dieter Borgwardt recovered human bones and a first wooden club sticking out of a bank of the river Tollense. Among the bones, a humerus with a flint arrowhead still embedded suggested interpersonal violence. Since then, intense investigations (excavations and metal detector surveys) have been carried out at several sites over a 3 km stretch of the river Tollense, on land and under water. So far, more than 11,000 skeletal remains, for the most part disarticulated, have been recovered, intermingled with some animal bones and several Bronze Age weapons. These finds hint at an armed conflict of outstanding scale dating to about 1300–1250 cal BC.



Map of the Tollense valley and photo of the excavation (map: D. Schäffler, based on data provided by LIV M-V © GeoBasis-DE/M-V; photo: S. Suhr, LAKD M-V)



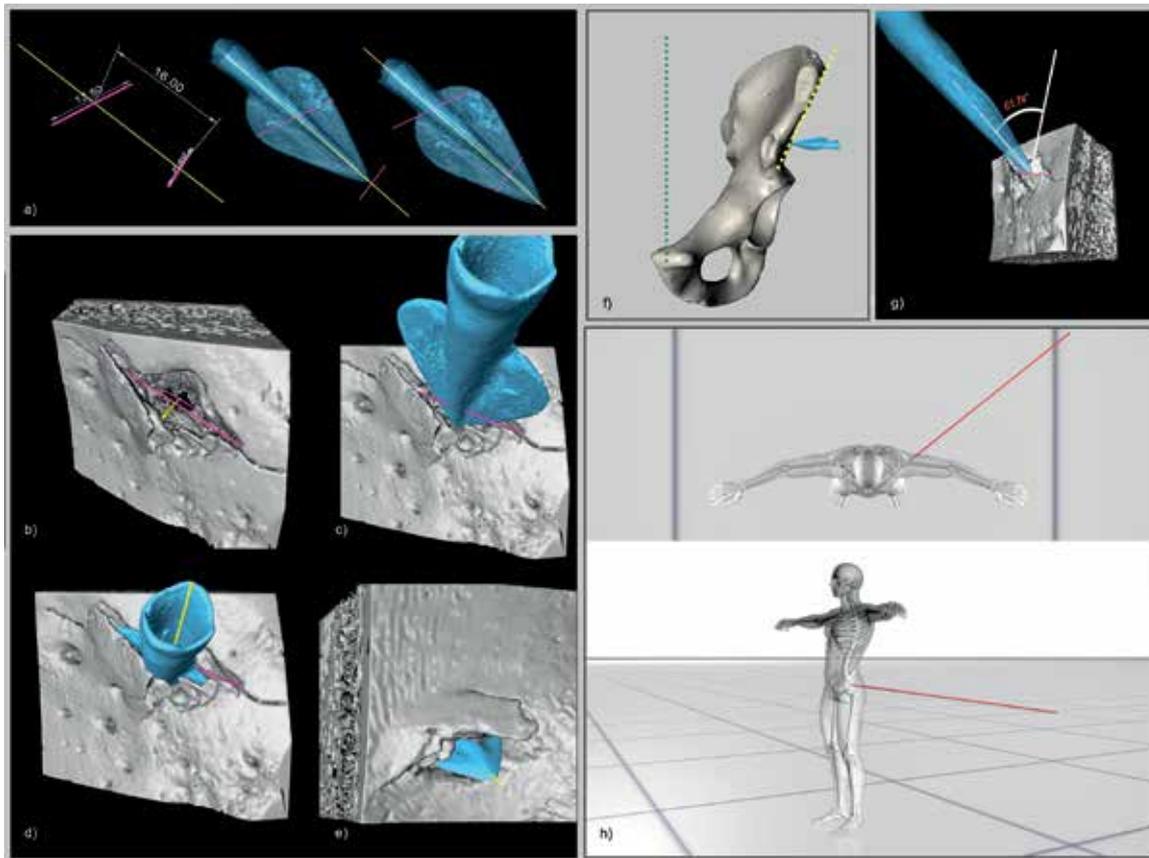
Schematic representation of the palaeomechanic workflow



3D digital imaging of lesions on human bones from the Tollense valley. Top: 3D digital microscopy of a vertebra with perforation. Middle: volume model of the vertebra and virtual sections of the injury canal, showing the inner structures based on micro-CTs. Bottom: 3D views of a 'virtual cast' (left) of an injured humerus (right – volume model) representing the tip of the weapon (analysis and reconstruction: H. Harten-Buga. Micro-CT scan: BAM – Federal Institute for Materials Research and Testing)

From 2010 to 2016 an interdisciplinary DFG (German Research Foundation) funded project aimed to reconstruct this violent event. The osteoarchaeological team used anthropological, morphological and palaeopathological as well as genetic and isotope analyses to investigate the

human remains. They determined the minimum number of individuals and their sex, age and stature. The results suggest a predominance of young adult males. In addition, nearly 100 human bones with perimortem injuries were identified. The lesions appear to be consistent with the



Vector-based 3D reconstruction of the injury mechanism and digital weapon matching of a perforated hip bone from the Tollense valley, referenced with 3D models of arrowheads (a–e). Visualisation of the direction and angle of attack (f–h) (analysis, reconstruction and visualisation: H. Harten-Buga. Micro-CT scan: BAM – Federal Institute for Materials Research and Testing)

range of weapons from the valley, which include various flint and bronze arrowheads, different types of spearheads, an axe and wooden clubs, even if so far only the wooden clubs and the arrowheads can be directly associated with the skeletal remains.

Evidence for the use of long-range and close-combat weapons led to a preliminary reconstruction of the battle. One scenario currently discussed suggests that archers took part in an attack on a group of men who attempted to cross the river. The fighting then shifted northwards, and members of both sides were killed in action at several locations of the battlefield. The dead were then looted and left in the swampy valley, where the bodies decomposed. Fluvial activity in the shallows of the river commingled the bones of different individuals within several square meters per site, but there are still individual anatomical connections in the sometimes dense accumulations of bones.

Only a few percent of the battlefield have been investigated. Hence the identified number of casualties can be extrapolated from at least 300 to as high as around 1000 people. Considering the extraordinary scale of the armed conflict, the Tollense valley site represents the earliest evidence of organised warfare in Europe. A comprehensive report on research so far can be found in the volume *Tod im Tollensetal, Teil 1: Die Forschungen bis 2011* edited by Detlef Jantzen, Jörg Orschiedt, Jürgen Piek and Thomas Terberger, but also

in various papers. A full list is available from our project log on ResearchGate ('Battlefield archaeology – Bronze Age battlefield Tollense valley').

In the last few years the osteoarchaeological analyses have not only focused on the identification of injuries and any signs of healing, but also on the characterisation of the injury patterns and the identification of the weapons which caused them. Experiments such as weapon testing on animal bones with replicas of Bronze Age weapons were also carried out. But the complex and highly dynamic processes which led to traumata on prehistoric human bones are difficult to determine by conventional methods and experimental approaches. In order to address this issue, we have developed an innovative methodological process which we named 'palaeomechanics'. This transdisciplinary suite of non-invasive methods covers 3D digital imaging and 3D reconstructions combined with the finite element method (FEM), originally used in the engineering sciences. The aim of this approach is to investigate the relationship between the external mechanical forces affecting the bone and specific injury patterns, as well as the effects on the weapon types themselves.

Also funded by the DFG, the research project 'Palaeomechanical investigations concerning the coherence of injury patterns and weapon efficiency on the basis of Bronze Age human bones and weapons' began in September 2017 and is led by Jörg Orschiedt, Frank Nikulka and Detlef Jantzen.

The palaeomechanical workflow is subdivided into two phases. The first phase includes the development of a hypothesis regarding the mechanism of injury. The second phase aims to verify this hypothesis. The process starts with an in-depth digital imaging analysis, carried out with a 3D digital microscope and post-processing software used to analyse micro-CT scans. It includes 3D rendering techniques, segmentations and multiplanar reconstruction (MPR) in order to identify and document all micro-traces and characteristics of the external and internal bone structures in the area of the lesion. For example, by running a segmentation process embedded fragments of the weapon which caused an injury can be visualised and isolated. Also 'virtual casts' of the lesion can be generated, which replicate the tip of the weapon. In addition, 3D models of the lesions can be viewed from all perspectives, trimmed and sectioned virtually, for example in order to examine the injury canal.

Based on the identified features and taking into account osteoarchaeological and forensic studies from literature, 3D digital weapon matching and a 3D simulation of the injury mechanism are then conducted. The first phase ends with the formulation of the hypothesis and includes, among other aspects, the possible weapon type and/or material as well as the direction and angle of attack. The results serve as input data and boundary conditions for the second phase.

The second phase, the numeric simulation of the mechanism of injury, is carried out using a complex computational

approach called the finite element method, which allows for example the calculation and visualisation of where and how the bone and/or the weapon would have been deformed or broken during the collision and impact. This analysis is based on material properties and loading conditions. With regards to bone trauma and causative weapons, the simulation enables us to numerically verify or falsify the initial hypotheses of how the lesion was sustained and provides indicators of weapon efficiency.

Our palaeomechanical studies aim to develop diagnostic criteria for the differentiation of specific injury patterns in relation to kinds of weapons, the possible use of protective armour, the applied strength and the shooting distances in order to help in reconstructing prehistoric conflicts, the development of weapon technology and prehistoric martial strategies, alongside providing additional data for further archaeological and forensic studies.

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## Determining the production stages of interlocking beads from Neolithic Çatalhöyük using microwear analysis and experimental archaeology

This article will detail one aspect of the project 'Perforating Prehistory', which investigated the stone and bone bead collection from the Neolithic site of Çatalhöyük. The project expanded on previous research conducted by Rosie Bains and was assisted financially by the research fund of the Prehistoric Society.

The methodology employed during the project involved microwear analysis and experimental archaeology. The analysis of the archaeological pieces was conducted on site at Çatalhöyük, using a stereomicroscope. The majority of the beads found on site were disc beads, which are roughly

circular and flattened in shape, however several other types were discovered, including 'interlocking beads', which are the focus of this article. The majority of these interlocking beads were made from bone, but several stone examples were also found. Within the broader category of interlocking beads, three sub-types could be identified: double perforated, flattened and pointed hourglass. The production process for the latter two appeared to have been rather complex. According to the faunal team, the flattened and pointed hourglass beads were not made from existing smaller bones, as might be concluded from initial observation of their shape (and as was the case with the 'double perforated' beads, which

### Meetings programme update

We are pleased to announce that the Society has been able to add to new lectures to the Meetings Programme for 2019. On Friday, 8th February 2019, Dr Duncan Garrow (Reading) will speak at the United Reformed Church Hall, Church Road, Welwyn Garden City, on "Islands of stone: Neolithic crannogs in the Outer Hebrides". This is the inaugural joint lecture with the Welwyn Archaeological Society. On Wednesday, 6th March 2019, Prof Richard Bradley will deliver the inaugural joint lecture with the Cork Historical and Archaeological Society, speaking on "Visions and revisions: Langdale axes, rock art and the Neolithic of Britain and Ireland". This event will take place at the Crawford Art Gallery, Emmet Place, Cork, at 8pm.

For further details and updates, please visit the Society website.



From left to right: Stone and bone pointed hourglass interlocking beads (archaeological); stone preform for flattened interlocking beads (archaeological); groove visible on end of finished flattened interlocking bead (archaeological)

were made from smaller hollow bones), but instead from smaller sections of larger long bones. The discovery of several bead preform ‘rods’ in different stages of manufacture in both stone and bone supported this hypothesis, and enabled me to suggest six production stages, detailed below.

Although there were finished versions of both the flattened and pointed hourglass beads, the preforms that were found were more suggestive of the flattened interlocking beads. This then led to the question of whether the pointed hourglass interlocking beads could have been made using the same manufacturing technique, or whether they were made individually. In order to better understand the complexities of the manufacturing process, experimental archaeology was used to replicate the different stages identified above. The full details will be published at a later date, but further insights into the manufacturing process are discussed below.

#### 1. Creation of a smoothly ground rod

Sections of long bone were easily split into thinner rods using flint knives and stone wedges. These rods were then ground against a sandstone block to form a slightly flattened, smooth rod. One thicker experimental piece was also created, in order to test whether the pointed hourglass sub-type could be made using the same technique of preform snapping.

#### 2. Separation of the rod into bead sections

Once the smooth rod had been created, it was then split into three different sections by cutting a groove into both sides of the preform with a flint knife. In several of the finished archaeological beads, the groove was still evident on the ends of the beads. The location of these grooves implies that they were not cut exactly parallel, but were slightly misaligned, which could allow an easier snap. The grooves were relatively deep, reaching approximately a third into the surface of the beads.

#### 3. Grinding of the bead sections to shape

Based on the archaeological evidence, a small dip was ground into each section of the bead preform in the region where the perforation was to be drilled. This dip created the interlocking shape of the bead, and could also perform a practical function by decreasing the volume of material to be drilled. The dip was created by grinding the respective section of the preform against the edge of a grinding stone.

#### 4. Perforation of bead sections

The most recognised technique of prehistoric drilling is to perforate the preform from both sides to create a biconical perforation. This technique was also evident in the majority of the archaeological beads from Çatalhöyük, however the interlocking beads were an exception. The perforations were straighter, although the start of a sloping perforation entrance was visible around the edges of the hole. This suggests that a biconical perforation was initially drilled, but was then intentionally altered to create a smoother and straighter perforation. The reasons for this are unclear, as is the method used, although a smoother middle of the hole could cause less friction against the cord used to connect the beads. The perforations of the experimental beads were drilled using flint, obsidian and copper, all materials available on site. In general, the flint drills were the most effective. Although the obsidian was sharper, it was also more brittle, so broke more often and required more retouch. The copper drill-bit was altered in shape during the drilling process and it therefore took a lot longer to drill using copper than with the stone drill-bits.

#### 5. Snapping of sections into individual beads

The most difficult stage of production was the snapping of the preform into the individual beads. For the thinnest preform, the three sections could be easily split by hand. For the standard thickness preform, however, one section was snapped along the mid-line of the perforation, thus rendering the bead unusable. Interestingly, the same accidental break was evident on one of the archaeological stone preforms, which supports the idea that this snapping technique was used. For the thickest preform – the one that was created



Unfinished bone preform for flattened interlocking beads (experimental)

to make the pointed hourglass sub-type – it was impossible to break the preform into sections. The bone was soaked in water for several days, and different people were asked to try and break the preform, but with no result. This strongly suggests that, although the flattened sub-type was made using the snapping preform technique, the pointed hourglass beads were more likely to have been made individually, in the same way as the disc beads on site were also made individually.

#### 6. *Grinding of the individual beads*

Those sections that could be snapped from the original preform were ground further to create finished interlocking beads. These beads were more similar to the flattened interlocking beads identified in the archaeological record, which further supports the idea that this sub-type was created using this particular manufacturing process, whereas the thicker pointed hourglass interlocking beads were made individually.

According to the chronology of the site, it appears that the flattened bone beads were the first to be created (c.6700–6500 BC), either individually or from the preforms discovered. The

presence of these preforms only in later layers (6500–6300 BC) could be used to suggest an increase in so-called ‘mass-production’ on site, as more beads could be made from a single preform. However, pointed hourglass types (in both stone and bone) were also discovered only in the later layers, which could in contrast suggest an increase in craft specialisation, as these beads were apparently made individually. In order to fully understand this highly complex aspect of craft production and how it evolved over time, a larger-scale study of the manufacturing process of all the bead types is required, correlated with other kinds of artefact on site. This is currently being carried out by the wider Çatalhöyük team.

#### *Acknowledgements*

I would like to acknowledge the Prehistoric Society, the Çatalhöyük research project, the Leids Universiteits Fonds and the Catherina van Tussenbroek foundation for enabling the project to take place

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## Excavations at AlUyaynah: Neolithisation in the Kingdom of Saudi Arabia

To date the Neolithic in Saudi Arabia is mostly known from surface surveys. From these surveys it was shown that the lithic industry (of flakes, blades and bladelets) differed from that of the Near East, the region from which the Neolithic in Saudi Arabia is widely thought to have originated. The exact speed and form of Neolithisation of the Arabian peninsula thus remains uncertain. The excavation and analysis of the Neolithic tell site of AlUyaynah hopes to provide more detail on the spread of the Neolithic in this region. The site is located on a low sandy area north of Tabuk in the north-west part of Saudi Arabia, therefore whether the cultural remains at the site belong to the Pre-Pottery Neolithic (PPN) of the Levant or have independent characteristics is a key research question. Radiocarbon dating could shed much light on how and when the Neolithic arrived in Saudi Arabia.

Today the whole area is covered with moving sands, and stone structures appeared where the sands were eroded. During the Neolithic the landscape would have been greener than today, with a richer cover of vegetation and increased rainfall. The site rises to c.5 m above the surrounding area and occupies an area of c.160 × 120 m. During short excavation seasons from 2010–2012 and again in 2016, Khalid Alasmari excavated a shallow 50 × 50 m area of the site to determine its extent. Seven test pits were also excavated where concentrations of archaeological materials were found. The results of these excavations and test pits were extremely positive, demonstrating the existence of Neolithic habitation deposits up to 280 cm deep in some places.

The stone structures reflect the permanent nature of the site where a group of houses with regular shapes have been built

adjacent to each other. Straight walls were constructed in many parts of the site without use of any kind of mortar. Thanks to the amendments and additions that have been made to the buildings, at least two stages of construction can be identified. The lithic artefacts were collected from the surface, as well as excavated strata. Blade technology is characteristic of the region and was used to produce arrowheads, scrapers, borers, burins and retouched and un-retouched blades. The ground stone sample recovered from the site includes querns, disc grinders and pounders. Three types of hearths were revealed during excavations (constructed hearth, pit hearth and simple hearth) which all show similarities to examples from Pre-Pottery Neolithic (PPN) A and B sites in the Levant (e.g. Tel Ar Ramad, Syria). More unusually, small unfired clay objects in different shapes were found in two concentrations. More details will be provided in Alasmari's PhD dissertation (due to be submitted in 2019).



*The section of Square A2-1, demonstrating the intermittent burning at AlUyaynah*



Plan of structure excavated during the 2016 excavations. Square A2-1 is located in the bottom right-hand corner of the building

The initial findings from the excavation, including radiocarbon dates on bulk charcoal and ash from different levels (carried out by Beta Analytic Inc), formed the basis for Asmari's Masters dissertation at King Saud University. The dates yielded results between  $8150 \pm 50$  BP and  $5830 \pm 50$  BP, calibrated to the early eighth (7050 cal BC) or late seventh millennium cal BC (6820–6650 cal BC). This suggests that AlUyaynah was the oldest known example of stone structures in Saudi Arabia and contemporary to known structures in the Levant dating to the PPN periods. Excavations in 2016 in the centre of the site produced a *c.*3 m thick stratigraphy, which included well-identified burning layers at regular intervals. The opportunity arose to carry out dating on identified, short-life, well stratified charcoal. One of the authors (DJ), an expert in anthracological analysis with an expertise in arid environments, was able to identify charcoal to the species *Tamarix* and to select short-life samples. We were awarded one date as part of the the Prehistoric Society/SUERC radiocarbon dating award, for which we would like to thank the Society and SUERC.

A sample from a depth of 250 cm was successfully dated. It returned an uncalibrated date of  $7984 \pm 35$  BP. This calibrates to 7051–6713 cal BC (95.4% probability) and 7036–6829 (68.2% probability). This date places AlUyaynah towards the end of the PPNB in the Near East, which is currently dated as *c.*8800–6900 cal BC, but importantly confirms that the site is contemporary to the PPN of the Levant and therefore belonged to the Mediterranean culture region.

The study of the site continues to reveal interesting results, some of which are highlighting important information about the development of Neolithic settlement in the north of the Arabian peninsula for the first time. These findings are not only identifying the cultural development in north-west Saudi Arabia, but are also beginning to give indications of its relationship to neighbouring regions, especially as this suggests the Neolithic was spread by cultural diffusion from certain areas in the Fertile Crescent, also shown in the shared architectural styles.

*Khalid Alasmari (kfma500@york.ac.uk), Penny Bickle, Delphine Joly and Geoff Bailey (all University of York)*

## Six New Prehistoric Society Research Papers

After launching this peer-reviewed series in 2009, and the publication of six well-received volumes, we now have six new titles, the first of which will be available next year:

- the huge and major *magnum opus* (*c.*670 pages and 233 illustrations) on *The Beaker People: isotopes, mobility and diet in prehistoric Britain* (eds Parker Pearson, Jay, Sheridan, Chamberlain, Richards and Evans), which examines the osteology, health, wealth and diet of Beaker individuals set within a huge new corpus of radiocarbon dates and isotope analyses
- Alex Gibson's edited volume of *Bell Beaker settlement in Europe*, the first pan-European synthesis of its type
- Eszter Bánffy's study on *The first farmers of the Carpathian Basin and a monumental figurine*, documenting the change in farming from ovicapids to cattle and its ideological implications

Further volumes planned are Scott and Shaw's work on Early Neanderthal lifeways around the Channel; Adams, Brück and Webley's *The social context of technology*; and Topping's review of Neolithic stone extraction, quarrying and collections. We are also discussing new titles, all competitively priced, and will keep members updated.

# STATEMENT OF FINANCIAL ACTIVITIES FOR THE YEAR ENDED 31 DECEMBER 2017

	2017	2016
	£	£
<i>Income</i>		
Income from donations and legacies	36,627	38,445
<b>Income from charitable activities:</b>		
Publication grants	2,538	4,086
Copyright fees	180	53
Publications	21,737	19,024
Conferences	10,812	12,086
Other lectures and visits	-	-
Investment income	6,404	7,190
<b>Total income</b>	<b>78,298</b>	<b>80,884</b>
<i>Expenditure</i>		
Expenditure on raising funds	7,722	8,082
<b>Expenditure on charitable activities:</b>		
Grants	10,272	8,625
Education support	72	1,000
Lectures	560	580
Proceedings	20,514	21,929
PAST	3,921	5,078
Research Papers	-	-
Conferences	15,456	21,346
Expenditure on governance	9,131	6,943
<b>Total expenditure</b>	<b>67,648</b>	<b>73,583</b>
<b>Net income</b>	<b>10,650</b>	<b>7,301</b>
Total funds at 1 January	213,510	194,565
Net income	10,650	7,301
Unrealised investment gains	3,090	11,644
<b>Total funds at 31 December</b>	<b>227,250</b>	<b>213,510</b>

The Statement of Financial Activities is an extract from the full accounts of the Society. Copies of the full accounts for 2017 are available on the website or can be obtained from Tessa Machling at the registered office.

### *Report of the Treasurer*

The Society's accounts remain healthy. Costs have continued to rise in a number of areas, particularly in room hire and travel expenses, although we continue to be vigilant in these areas. Nevertheless, we continued to do well in staying within budget for administrative and governance costs, and this remains a small proportion of our outgoings. The considerable benefit continues of income from royalties from CUP in respect of institutional subscriptions and access to back copies online. Individual membership remains healthy and voluntary income (subscriptions and donations) remains

stable for another year. Our investments have performed less well than in previous years, but better than might have been expected in the volatile situation of the last year. Our reserves remain healthy with an increased proportion easily accessible. The continued healthy cash position has meant that again in 2017 the Society was able to increase the budget for grants, and again provided a greater level of grant assistance in 2017 than the previous year. We have also been able to continue to provide assistance for conferences and events not organised by the Prehistoric Society and increase partnerships in this area.

## Europa conference 2018

This year's Prehistoric Society Europa Conference was hosted by the University of York to celebrate Professor Geoff Bailey's achievements and contributions to coastal archaeology.

After a welcome and introduction from Alex Gibson, the society's president, Simon Holdoway re-assessed coastal colonisation in Queensland, Australia, and northern New Zealand. Scales of analysis were considered alongside local formation processes and the nature of shell middens as palimpsests. Matthew Meredith-Williams and Niklas Hausmann discussed results of their investigation into shell midden formation across the Farasan Islands in Saudi Arabia, based on Bailey's theory of time perspectivism. Atilio Francisco Zangrando considered taphonomic processes for site formation and preservation in southern South America. Manuel Will opened the next session on submerged Pleistocene landscapes and compared exploitation of coastal resources by *Homo sapiens* and Neanderthals across the Mediterranean, Atlantic and Indian Ocean, finding more similarity than difference. Rachel Bynoe repositioned Pleistocene coastal occupation by presenting terrestrial data from submerged lowlands in the southern North Sea basin. William Mills reviewed palaeoenvironmental, sedimentary and archaeological records for the Channel river during the Late Glacial and questioned the impact of evolving coastal and estuarine landscapes on movement in southern Britain. Robyn Inglis wrapped up the morning by exploring local variation in Palaeolithic Saudi Arabia, a 'highway' for *H. sapiens* dispersal across the globe.

After lunch discussion returned to shell midden analysis. Amy Prendergast used molluscan data from Israel and Lebanon to understand how Early Modern Humans might have inhabited the environment during both warmer and cooler phases. André Colonese looked at shell mounds (*sambaquis*) along the Brazilian Atlantic coast in the Middle Holocene and showed how oral pathology, as well as faunal and plant remains, suggest diet was not limited to marine resources. New excavations at an inland freshwater shell midden and burial site in Latvia were

discussed by Mārcus Kalniņš, using photogrammetry and 3D modelling to understand the complex stratigraphy. Stephanie Piper presented preliminary research into early prehistoric occupation on the Inner Hebridean Small Isles, where worked Rum bloodstone suggests movement of people between islands. Bioarchaeological research along the Estonian and Latvian coastline was presented by Michael Rivera, where skeletal and dental signatures for agricultural diet and practice are not visible until the Bronze Age.

Session 4 returned to the theme of submerged landscapes with an introduction to the 'Europe's Lost Frontiers' project which utilises seismic mapping, environmental analysis and computer simulations to reconstruct palaeolandscapes in Doggerland. Micheál Butler focused on computational modelling, while Andy Fraser explained how seismic mapping guides a sediment-coring programme. Daniel Groß summarised the 'Scales of Transformation' project and new excavations in northern Germany, highlighting small-scale variations and localised processes across the Early and Mid-Holocene Mesolithic. Marcel Niekus gave the last of Friday's presentations with some exciting finds from the Dutch coast, including a Neanderthal skull, decorated bone and engraved ornaments.

Saturday began with Clive Gamble's paper, which considered Geoff Bailey's tectonic trail between eastern Africa and Asia as a varied ecoscape for human evolution. Chris Stringer focused on dispersal patterns of *H. sapiens* out of Africa, with new evidence for earlier and more complex events including interbreeding and sporadic, interrupted occupation. Nena Galanidou presented narratives of dispersal from the perspective of changing landscapes and island cut-off during the Middle Pleistocene in the Aegean and Ionian Seas. Hein Bjerck closed the morning with a discussion of Doggerland sea-ice as terrestrial seal hunting ground during the Late Pleistocene, and motivation for later hunting at sea.

After lunch Helen Farr presented a global project using multidisciplinary research to consider changing seascapes, the



Geoff Bailey surrounded by the speakers of this year's Europa conference

interplay with human evolution and why people might have taken to the sea. We then returned to 'Europe's Lost Frontiers' and were treated to the first results from the project by Vincent Gaffney. Doggerland has been mapped, river channels have been identified and Brown Bank will now be cored.

The AGM was chaired one last time by Alex Gibson, who stepped down from his post as president and was given a warm tribute by the vice-chair. The Baguley prize was given to Neil Carlin for his contribution exploring the relationship between Grooved Ware and passage tombs in Ireland (PPS 83). The winners were also announced for the poster competition. Geoff Bailey introduced his Europa lecture by acknowledging those who had influenced his work on coastal and submerged archaeology, particularly Graham

Clark, before discussing the dynamic nature of landscape and relationships between terrestrial and coastal or marine environments. Future challenges include locating underwater sites and the formation and deformation in archaeological records and palaeolandscapes.

As always, the opportunity to become acquainted with these research projects would not be possible without the hard work of many others and we would like to offer our thanks to the organising committee and volunteers, including Alex Gibson, Nicky Milner and Courtney Nimura. We would also like to thank the Department of Archaeology, University of York for hosting and sponsoring Friday's wine reception, Cambridge University Press for Saturday's reception, and BAR publishing for the poster event.

*Samantha Brummage, Birkbeck (sbrumm01@mail.bbk.ac.uk)*

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## Clark medal awarded to Alison Sheridan

*PAST* is delighted to report that this year's winner of the highly prestigious British Academy Grahame Clark medal is our former President Dr Alison Sheridan. The award ceremony took place at the British Academy on Tuesday 25th of September when Sir David Cannadine handed Alison the medal.

On hearing of her prize Alison said: 'I am overwhelmed and deeply honoured to be the recipient of this prestigious medal. This is a wonderful endorsement of the value of museum-based research and of the role of the museum curator in furthering our understanding of our prehistory. It is a real privilege to be working at such a fascinating time'.

Alison joins the ranks of Stuart Piggott, Geoff Wainwright, John Coles and Paul Mellars as past Presidents of the Society who have received the Grahame Clark medal alongside past Vice Presidents John Wymer, Barry Cunliffe and Richard Bradley. The first medal was awarded in 1993 to recognise distinguished achievements in the study of prehistoric



*Alison and her brand new medal*

archaeology. Among Alison's many international projects which this award recognises are her pioneering work on the jadeite axes and megalithic traditions of Britain and Europe and those most mobile of early Europeans, the Beaker people. Her work will be showcased at next year's Europa conference, held in her honour on Jersey on the 14th–16th of June.

### *Europa 2019: Neolithic Connections: Britain, The Channel Islands and France* Pomme d'Or Hotel, St Helier, Jersey, 14–16 June 2019

We are delighted to announce that the winner of the 2019 Europa prize is Dr Alison Sheridan, National Museums Scotland, who is well known for her work on the Neolithisation of Britain, Ireland, The Channel Islands and France, and the connections amongst them. This year's conference is being organised with Jersey Heritage, and therefore the Friday will be spent touring some of the spectacular prehistoric archaeology of the island. Saturday will feature lectures by international authorities invited by Dr Sheridan. Speakers include: Tom Booth (Natural History Museum), Olga Finch (Jersey Heritage), Luc Laporte (University of Rennes), Lesley McFadyen (Birkbeck, University of London), Chris Scarre (University of Durham), and Fraser Sturt (University of Southampton). The Europa lecture itself will be titled: "Neolithic movements and contacts across the Channel and along the western and eastern seaways of Britain: what we know and what we need to find out".

Along with a day and a half of lectures and a full day excursion, the conference will also include exhibitors and a poster display. Those interested in displaying a poster should send a 150 word abstract to Annabell Zander at az661@york.ac.uk by Sunday 12 May 2019. Places for the Europa lecture itself are strictly limited, so early booking is advisable. Please use the booking form included in this issue or book online. Full details and a downloadable booking form are also available on our website.

## Filling the gaps: new research on the Mendip Hills, Somerset

Since 2012, the University of Worcester has been carrying out survey and excavation at a series of sites in the parish of Priddy, on the Mendip Hills in Somerset. The project is ongoing but some of the preliminary results will be presented here.

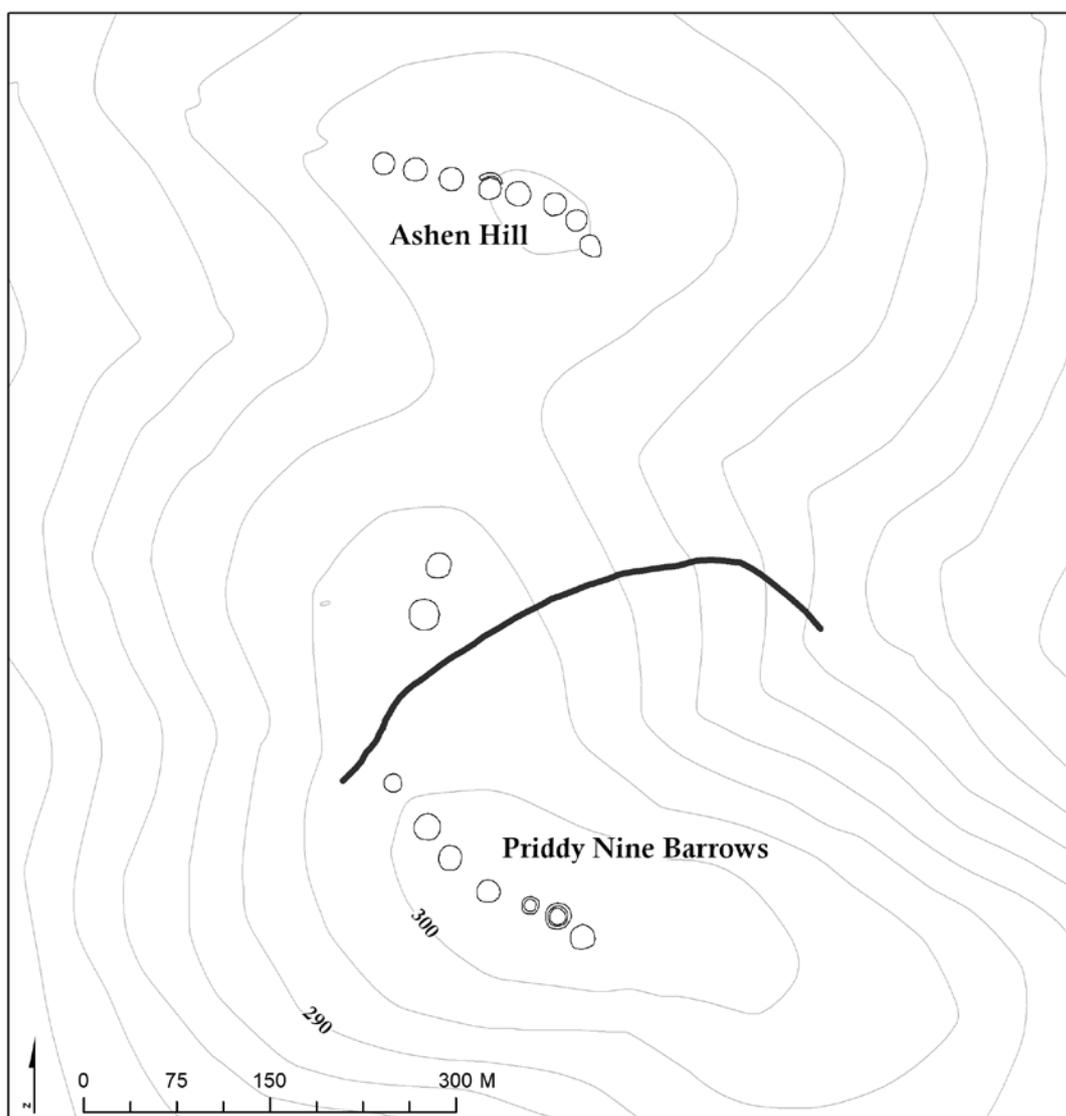
From 2013–2015, our focus was North Hill, Priddy. Members of the society will be familiar with this hill as the location of the impressive Priddy Nine and Ashen Hill linear barrow cemeteries. The hill is located just south of the Priddy Circles, where excavations by the team in 2008 suggested an early third millennium BC date for the construction of this monument complex.

In 2013 a small mound lying to the south of the Nine Barrows was excavated and found to be a previously unrecorded Bronze Age barrow. The barrow had been robbed but a complex construction sequence was revealed.

Radiocarbon dating of short-lived species charcoal and cremated bone indicates the main period of use was between the nineteenth and seventeenth centuries cal BC.

During the 2014 season, our attention turned to a curvilinear earthwork running between a gap in the Priddy Nine Barrow cemetery. The barrow cemetery is comprised of seven closely spaced monuments with a further pair *c.* 120 m to the north-west. The gap in the cemetery has been a source of concern, with ‘missing’ round barrows postulated as the explanation. We thought this unlikely however, and indeed geophysical surveys undertaken prior to our work and again as part of our project revealed no traces of further barrows.

The curvilinear earthwork runs for over 650 m from a spring in the east and passes westwards through this gap before terminating just beyond the barrow cemetery. It varies in width between 1 m and 8 m and survives in places up

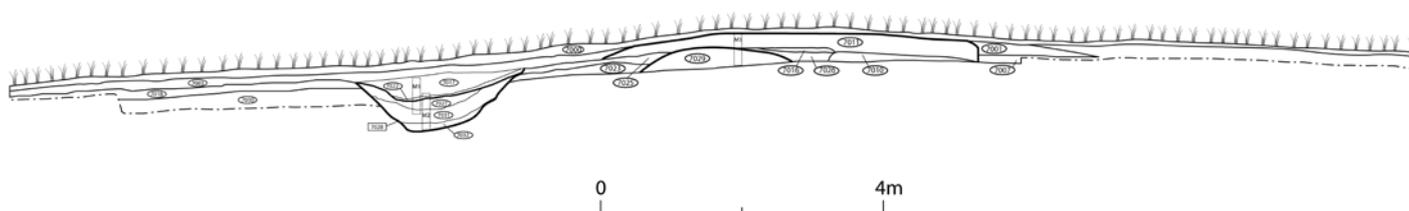


Plan of the Priddy Nine and Ashen Hill barrow cemeteries in relation to the bank. Line of bank plotted from Google Earth and LiDAR. © Crown Copyright and Database Right (2018). Ordnance Survey (Digimap Licence)

## TRENCH 7: SOUTH FACING SECTION

W

E



Section drawing of the bank



Students marking the line of the bank with the Priddy Nine barrows in the background

to 1 m high. There are traces of a ditch, up to 3 m wide, on the northern side. The earthwork is recorded on the Somerset HER as a post-medieval minery boundary and it was subsequently partly surveyed by Historic England. However, we were sceptical of the post-medieval attribution, as the earthwork passes beneath a medieval parish boundary and appears rather too degraded to be of such recent date.

In 2015, prior to the publication of the Historic England survey, and in conjunction with local community archaeology group ALERT, we carried out geophysical and topographical survey of part of the earthwork and excavated a trench across it. This revealed the bank to be segmented, with an external ditch up to 2.5 m wide and 1 m deep, which had been recut on at least one occasion. The bank was of multiple phases and over 4.5 m wide, formed initially by a 2 m wide earthen bank. Neolithic worked flint was recovered from all bank and ditch contexts and represents the only find type. A series of radiocarbon samples were recovered from the different phases of the bank and ditch (all charcoal from short-lived species) and the dates all fall between the early to mid fourth millennium cal BC.

The segmented bank and ditch construction and Early Neolithic date suggest it may broadly belong to the causewayed enclosure tradition, though it does not appear to form an enclosure or cut off a promontory. That the east end of the earthwork starts (or terminates) at a spring is significant, though the western terminal does not seem to have a relationship with any visible topographical features. It may be that the earthwork acted to delineate different spaces on the hill and/or that it formed part of an enclosure composed elsewhere of posts. We are currently assessing parallels for the site.

The presence of this curvilinear 'monument' also explains the gap in the Priddy Nine Barrow cemetery – the Bronze Age barrows were respecting, physically and symbolically, an earlier monument.

A further 'gap' is worth mentioning here. One of us (JL) has long been interested in the large space between circles 3 and 4 of the Priddy Circles, a gap which stubbornly survives despite attempts by previous researchers to squeeze another circle in. Her research is investigating the possibility that Circles 3 and 4 were set off a contemporary pathway or

## Membership

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If you are unsure about anything, or indeed cannot remember whether you have paid your dues for 2018, please email [prehistoric@ucl.ac.uk](mailto:prehistoric@ucl.ac.uk).

We hope you agree that with the Proceedings, newsletter, free lectures and many outings, membership is well worth the annual subscription fee. Please do continue your support for our many activities and the research we fund. Thank you!

that an earlier monument occupied the space, namely a Neolithic cursus later fossilised by the Roman road which passes between these two circles. Additional research is planned for the future.

The discovery of this new Early Neolithic monument on North Hill closes the curious gap in the sequence of Neolithic monumentality on the Mendip Hills. Long barrows are known, as are later monuments such as the Priddy Circles and various smaller henges, but the lack of a causewayed enclosure, or allied monument, has always been a puzzle. It also indicates that North Hill is crucial to understanding the development of this Neolithic landscape. The monumental Priddy Circles lie just to the north and other Neolithic sites cluster around the hill. It is possible too that North Hill was one of the sources of the Mendip Old Red Sandstone used to make the quern stones and rubbers found at numerous Early Neolithic sites and monuments across southern Britain. We are only now beginning to understand the significance

of this place, the most prominent hill rising from the upland limestone plateau.

#### Acknowledgments

We would like to thank the landowner, Mr Rob Uphill, for permitting and supporting the excavations, Natural England for granting derogations for the work and the South West Heritage Trust and Historic England for help and advice. We have worked closely with community archaeology group ALERT and benefitted hugely from their work. The excavations were supervised by Tom Elliot, Neal Johnson and Caroline Rosen and staffed by archaeology students from the University of Worcester. Robbie Austrums led the topographical and geophysical survey work, assisted in 2015 by Catherine Lodge. Funding for the project has been received from the Maltwood Fund, the Priddy Folk Festival and the University of Worcester, for which we are very grateful.

*Jodie Lewis (jodie.lewis@worc.ac.uk), David Mullin and Neal Johnson (all University of Worcester)*

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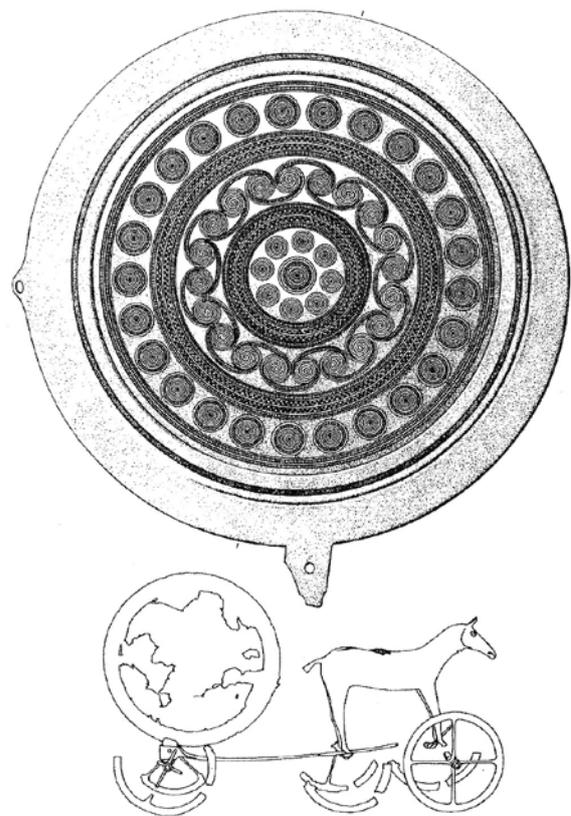
## New light on an Irish ‘sun-disc’ from the British Museum

In a paper published in 1905, Reginald Smith, then Assistant Keeper of the Department of British & Mediaeval Antiquities, drew attention to the similarities between the recently discovered Trundholm sun ‘chariot’ found in 1902, and a disc from the British Museum’s collection. The comparison was quickly forgotten and has rarely – if ever – been repeated, despite the growing fame of the sun discs in the wake of the discovery of the Nebra sky disc in Saxony-Anhalt, Germany. The purpose of this short contribution is to reassess Smith’s suggestion following a century of neglect.

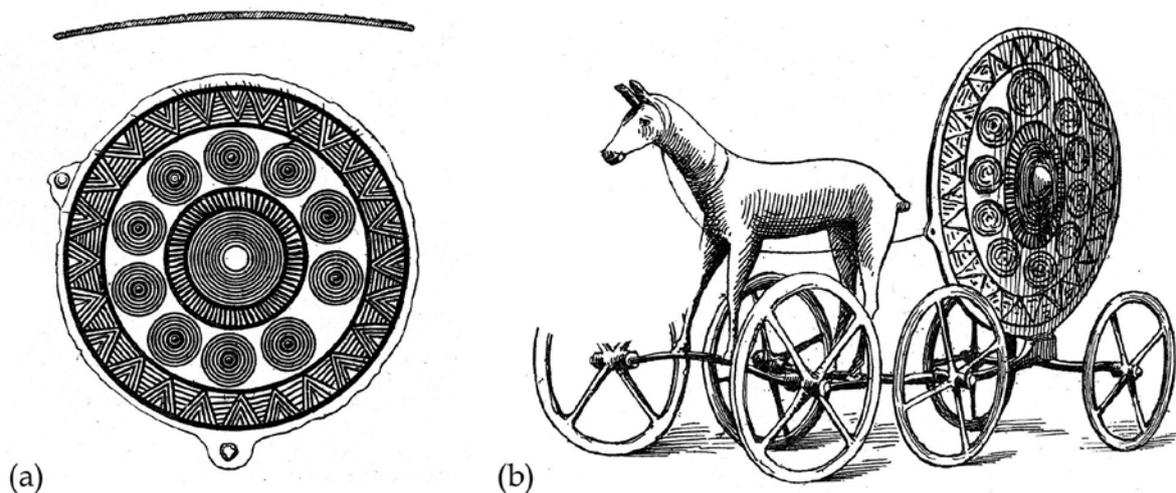
The first known reference to the disc comes from the acquisition register of the British Museum. It was part of a much bigger collection of artefacts acquired from Mr T. L. Cooke, a nineteenth-century historian and collector, from whom the Museum acquired items largely from Ireland during the period 1853 to 1854. The collection comprised objects of Bronze Age and medieval date, including the famous Dowris hoard, and was bought for the sum of £300 plus £6 expenses. The objects seem to be either from Ireland or without context. The disc is registered on July 14th, 1854, without any given provenance. It is described as follows in the registration book:

*‘Flat [sic] circular plate with pierced projections on the edge. The centre is pierced & surrounded with concentric circles round (...) are 10 other sets of concentric circles the centre [sic] of which are also pierced. The core is composed of a v and y tied (?) pattern. D. 3 in.’*

Unfortunately, neither the British Museum archives nor those of the Irish Society of Antiquarians contain any information



*The sun-disc (bronze side) of the sun ‘chariot’ from Trundholm, Højby parish, Holbæk County (from E. Aner and K. Kersten, 1976, Die Funde der älteren Bronzezeit des nordischen Kreises in Dänemark, Schleswig-Holstein und Niedersachsen, Bd. 2)*



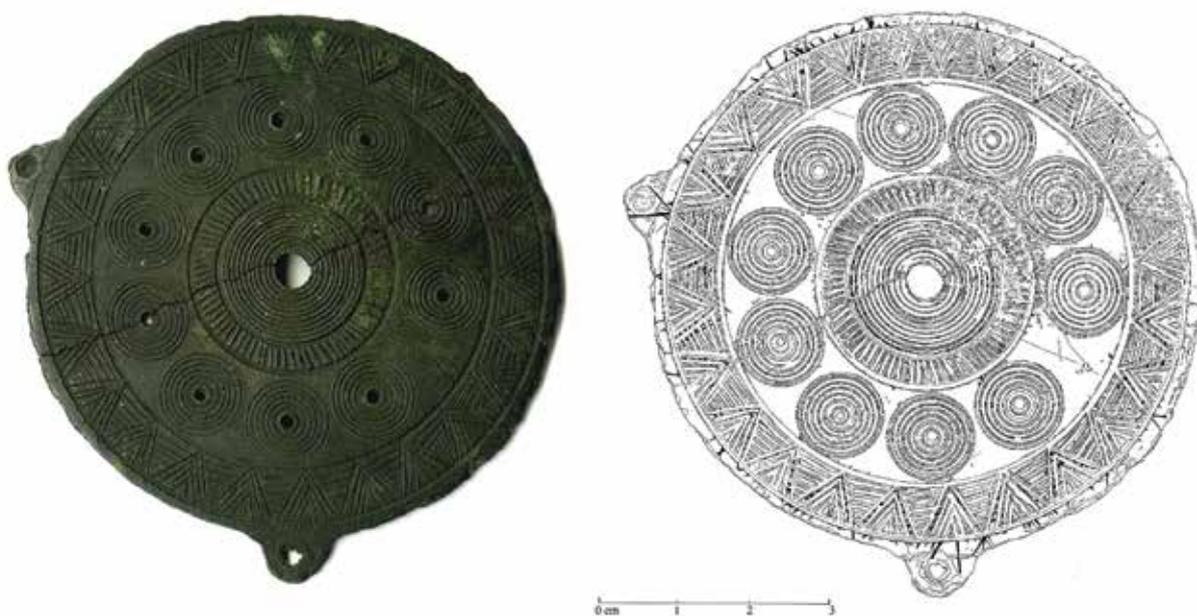
Cooke disc drawing (a) and attempted reconstruction of the disc as part of a sun horse ensemble (b) from the 1904 *Guide of the British Museum* (drawings: Reginald Smith; copyright: Trustees of the British Museum)

likely to enlighten us on the origin of the disc or its context of discovery.

Fifty years later, we know from the 1904 *Guide to the Antiquities of the Bronze Age in the Department of British and Medieval Antiquities* that the disc was displayed in the gold ornaments room at the beginning of the twentieth century. Its case contained gold objects, including four other discs 'of gold'. In the 1920 guide, a new display, arranged by countries, included the disc with four other gold examples 'from Ireland'. It is not clear when the disc came off display. Since then, the object itself has been kept in the museum's stores and quite forgotten, until the current curator of the European Bronze Age, Neil Wilkin, retrieved it on my request in 2014 in order that I may include it in my doctoral thesis. The disc has never been the subject of a study or a dedicated

publication. Although Reginald Smith's drawing appeared in several publications during the twentieth century, no photograph had ever been taken. In the absence of context to identify the disc, we chose to name it after its first known acquirer: the Cooke disc.

The Cooke disc is a circular and slightly concave copper alloy object. It is 68.6 mm large, 1.4 mm thick and weighs 36.3 g. It is decorated only on the upper face and presents two side loops without any apparent weld. The decoration is divided into four concentric bands, each exhibiting a different pattern. The disc was broken in two in the middle. A poor-quality restoration was carried out with a soldering on the blank side, but it is difficult to know when it was done in relation to the acquisition date of the disc by the British Museum.



The Cooke disc (photo and drawing: author)

The first, outermost band is decorated with a pattern Christopher Hawkes described as ‘dogtooth fashion’. This is an alternation of 50 incised triangles, either overlapping each other in groups of four (apex facing towards the centre), or hatched in six parallel lines (apex facing outwards). The second band is adorned with ten series of concentric circles drilled in the centre. Each series consists of five circles, 50 circles in all. The third band comprises a radiating decor with 72 irregular incisions of variable depth. The fourth and final band consists of ten concentric circles distributed around the central perforation of the disc.

The technical analysis of the disc is facilitated by a surprising number of imperfections in the design of the object. Tool marks are clearly visible all around the disc, and the construction features of the decoration can also be seen beyond the outer edge. Since the disc is made of copper alloy, we have to consider that it was cast in a mould. Preben Rønne described how artefacts such as the spiral-ornamented ‘belt plates’ from Early Bronze Age Denmark were cast using the *cire perdue* (lost wax) technique. Something similar may have been used for the Cooke disc. Judging by the regularity of their shape, we can state that all the concentric circle decorations were probably carried out in the mould with stamps and not directly punched into the disc. Other parts, such as the ‘dogtooth’ pattern and the radiant lines, were incised directly onto the surface of the object with a chisel.

The craftsperson seems to have had only a rough mastery of their tools when drawing decorations by incision, and many features have spilled over the surrounding decoration. Similarly, the distribution of the circles of the second band presents a singular gap, indicative of what seems to be a

lack of rigour in the regular spacing of the elements of the decor. These obvious mistakes on the final object are quite puzzling, especially the gap between the circles of the second band, since it would mean that the mould was faulty but used anyway.

Whether the Cooke disc was part of a sun ‘chariot’ similar to the one from Trundholm is yet to be determined, but the lack of context is a significant obstacle. Reginald Smith seemed convinced that the disc had the same function as its Danish counterpart, and even attempted a reconstruction drawing of the artefact as part of a similar hitch. To support his opinion, it should be noted that only these two discs have the side loops allowing, in the case of Trundholm, to affix one of the drawbars and the rein tied to the horse. The general shape of the two discs presents similarities that are as unique as they are decisive in order to justify comparing them directly. Further analysis must be conducted to determine, among other things, if the surface of the object was gold-plated, as Smith suggested.

In October, the Cooke disc has been loaned to the Stonehenge Visitor Centre for the *Making connections: Stonehenge in its prehistoric world* exhibition, a collaboration between English Heritage and the British Museum. Upon its return to the British Museum it will be subjected to analysis intended to shed more light on how the disc was made, used and broken.

I extend my warmest thanks to Dr Neil Wilkin for his invaluable help, support and guidance throughout this research.

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## The Historic Environment Image Resource

The HEIR (Historic Environment Image Resource) Project digital image archive at the Institute of Archaeology, University of Oxford, is a free innovative academic resource that can bring new perspectives to your work or the work of your students.

The archive currently contains more than 19,000 images taken from glass plate negatives, lantern slides, photographs, film negatives or 35 mm slides which span the years from the 1870s to the early 21st century. Although the majority of the images are black and white, over 3,000 are in colour. Contributors to the HEIR archive include the University of Oxford, the Ashmolean Museum, Historic England, the British Museum and Fellows of the Society of Antiquaries. Additional images of sites, site plans, drawings and artefacts are joining the database each week.

No password is needed to access the searchable database at <http://heir.arch.ox.ac.uk>. Users can search the database from the home screen and all information screens. Geographic search terms, such as the name of a county or site names,

generally work well in HEIR, but other search terms can be used and should yield an array of relevant images. Single-word searches such as ‘Neolithic’ (quote marks not required for the search), the surname of an archaeologist or a class of artefact can be used. Multi-word terms separated by commas (as in ‘bronze, age’) will also yield results. The five digit resource ID number or the full file name are also useful search terms when seeking a second view of a particular image. With keywords on many images, it is possible to generate topical subsets of pictures. For example, a search for ‘laundry’ generates interesting results, as a surprising number of our images showed archaeological sites accompanied by drying clothes or laundresses. As the database still has over 2,300 images showing unknown locations and additional keywords can be added to any image in the collection, feedback from users of the database with further information will be greatly appreciated.

Searches provide the user with thumbnail versions of the apposite images. Clicking on one of the thumbnails takes the user to a larger view of the image along with basic



*Stonehenge held up by wooden poles, as photographed by R.W. Wylie in the late 19th or early 20th century (held at the Institute of Archaeology, University of Oxford)*

information about the picture. If additional keywords or further information exist about the image, additional tabs will show on the basic information screen. Clicking on the image from the basic information screen will take the user to a larger view of the picture. As most images have been scanned at 1800 or 2400 dpi, many images can be enlarged five times before pixelating, allowing users to see fine detail in the pictures. Low-resolution images can be freely downloaded directly from the basic information screen for use online, in presentations or research papers, while high-resolution copies of images can be purchased from the HEIR Project for publications or other applications such as visual media. In all cases where the image is being used, it should be credited as being used with the permission of the institution or individual listed as the 'holder' of the image.

The database contains hundreds of images of archaeological sites and monuments in Britain, Europe, the Near East and North Africa, including excavations of sites such as Knossos, Kish, Vinča and Verulamium. Sites prior to excavation, restoration or destruction such as Carthage, Ephesus or Palmyra, and topics such as hillforts, standing stones, stone circles, churches, castles and cathedrals are all well represented in the collection. Many of these images have been unseen for 70 years or more.

The HEIR Project is currently adding scans of 35 mm slides from the collections of Christine Mahany, John Nandris, Caroline Wickham-Jones and Molly Cotton to the archive. Their images join those of John Myres, Stuart Piggott, O.G.S. Crawford, J.K. St Joseph and others, allowing users of the database to see changes to famous sites and monuments over more than a century due to climate change, increasing tourism and changes in monument conservation practices.



*One of the Calder Stones, originally part of a chambered tomb, in Liverpool's Calderstones Park, late 19th century. The stones were moved to a greenhouse in 1954, where the moisture has since deteriorated the petroglyphs, making the HEIR photographs an important record for how they once looked (photographer unknown; held at the Institute of Archaeology, University of Oxford).*

While general users can access most of the images in the HEIR Project database, for various reasons including copyright issues some images are restricted to password holders. These additional images may be viewed at the Archive, Institute of Archaeology, 36 Beaumont Street in Oxford by appointment. Please feel free to contact me for more information about the protected images or for further information about the HEIR Project and how it might support your research. Funding for this project comes from the Reva and David Logan Foundation, the University of Oxford and individual contributors.

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